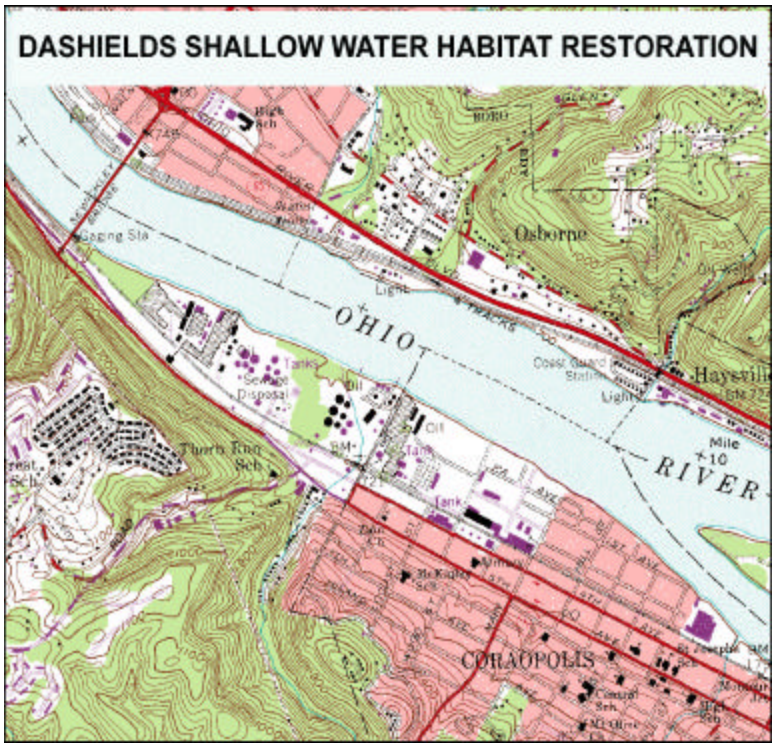
Dashields Shallow Water Habitat Restoration (PA-10)

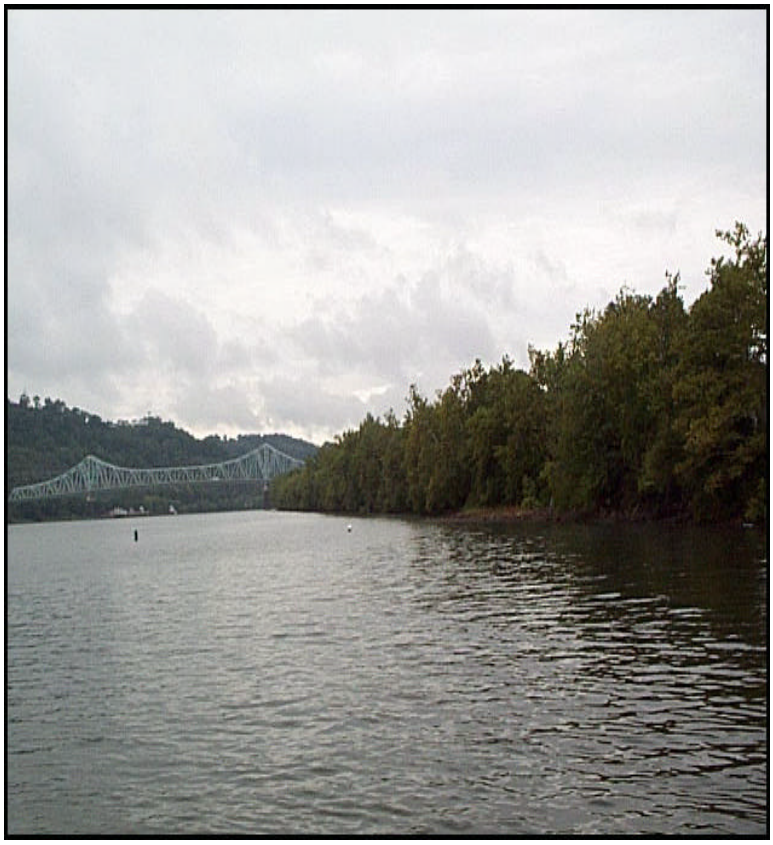
1.0 Location

The proposed Dashields Shallow Water Habitat Restoration project area is located in Allegheny County, Pennsylvania near Osborne. The area is located along the north shore of the Dashields Pool between Ohio River Miles (ORM) 11-11.5. The project site is within the jurisdiction of the Pittsburgh District, U.S. Army Corps of Engineers (USACE).



2.0 Project Goal, Description, and Rationale

The primary goal of the proposed Dashields Shallow Water Habitat Restoration project is to create and/or enhance shallow water habitats along the Ohio River shoreline. This project would involve placement of shallow water rock/gravel structures and fill along the shoreline. These rock structures and gravel fill would provide a hard substrate that would increase habitat diversity and ultimately species diversity. The submerged rocky habitats would provide increased spawning, nursery, and foraging habitat for a variety of riverine fishes and provide increased protection for other species, including mussels and benthic invertebrates. The improved shallow water habitat would help facilitate a sustained fishery resource in the area and therefore provide for improved recreational opportunities.



3.0 Existing Conditions

Terrestrial/Riparian Habitat: A narrow band of riparian habitat is located between the Ohio River and a road and railroad tracks to the north. Trees such as silver maple (Acer saccharinum) and black willow (Salix nigra) dominate the vegetation. Industrial and other developed areas lie just north of the railroad tracks and extend the length of the project area. A U.S. Coast Guard station and a remnant lock wall are located along the shoreline at the east end of the project area.

Aquatic Habitats: The existing shallow water habitat along the shoreline consists of a narrow shallow shelf that quickly drops off into deeper water. The shoreline itself contains littoral habitat with some submerged trees and logs. The substrate consists mostly of silt, mud, and organic matter and provides few benefits for aquatic organisms.

Wetlands: No jurisdictional wetlands are located within the Dashields Shallow Water Habitat Restoration project area.

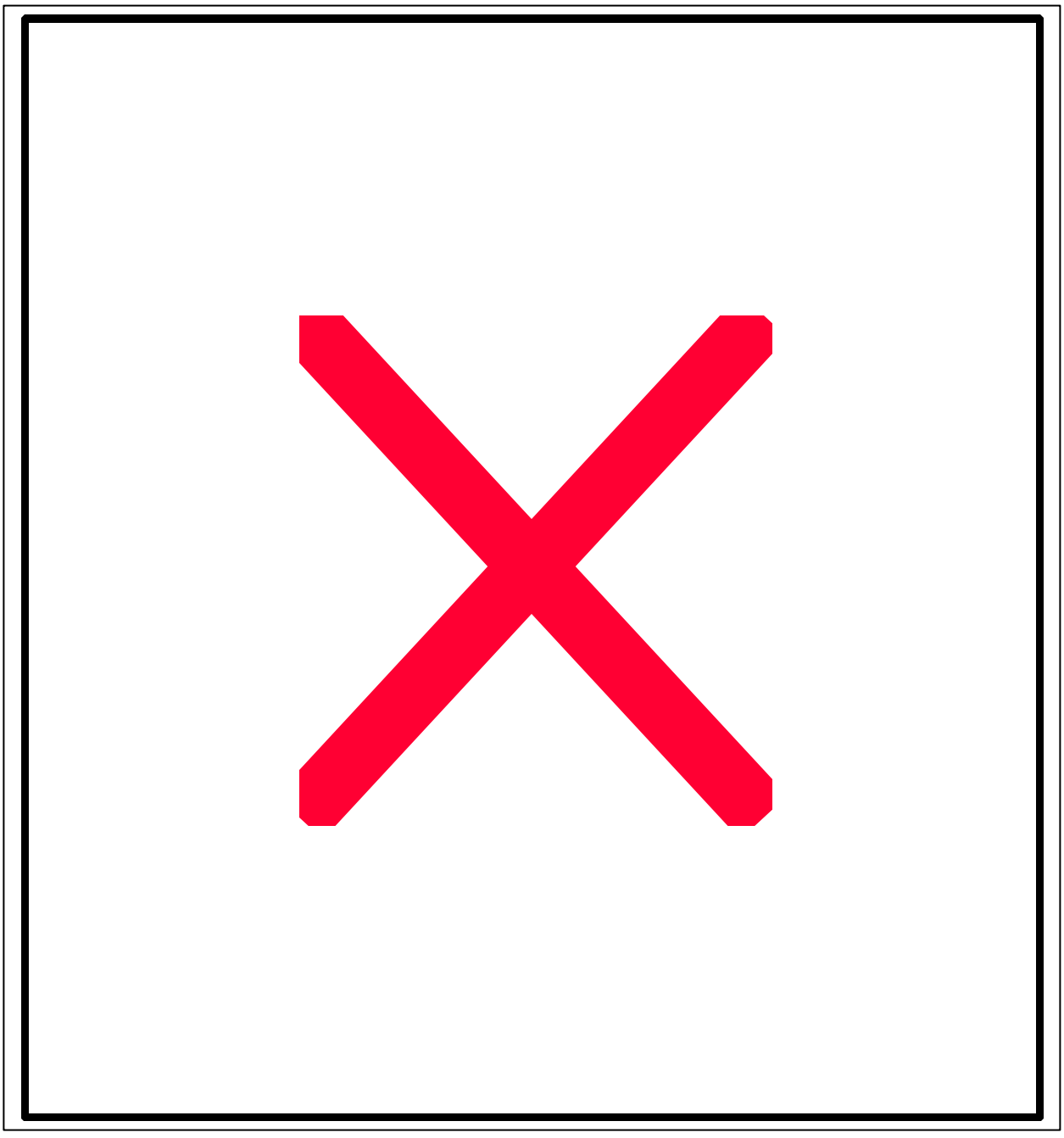
Federally-Listed Threatened and Endangered Species: According to the U.S. Fish and Wildlife Service (USFWS), there are three federally-listed endangered species known to occur in the Ohio River near Allegheny County, Pennsylvania. These species are listed on Table 1.

Historically, the upper Ohio River supported approximately 34 species of freshwater mussels. Between 1994 and 1997, only eight species of mussels were located during mussel surveys completed approximately 24 miles downstream of the proposed project area. However, these surveys were relatively limited in scope (USFWS, 1999).

All of the listed mussels are freshwater species that typically inhabit medium to large river systems. These mussels typically require clean-swept, course sand and gravel substrates and water depths from 0.5 to 8.0 meters. These species are generally associated with moderate to fast flowing water. Habitat within the proposed project area would not currently be considered potential habitat for the mussel species because dam construction, operation and maintenance of the navigational channel, and commercial sand and gravel dredging have converted most of the Ohio River into deep, slow-moving pools with soft, silty substrates (USFWS, 1999).

Table 1. Federally-listed species known to occur near Allegheny County, Pennsylvania			
Common Name	**Scientific Name**	**Federal Status**	**Potential Habitat Present**
ring pink mussel	*Obovaria retusa*	Endangered	No
rough pigtoe mussel	*Pleurobema plenum*	Endangered	No
fanshell mussel	*Cyprogenia stegaria*	Endangered	No
Source: U.S. Fish and Wildlife Service, 1999			

4.0 Project Diagram



5.0 Engineering Design, Assumptions, and Requirements

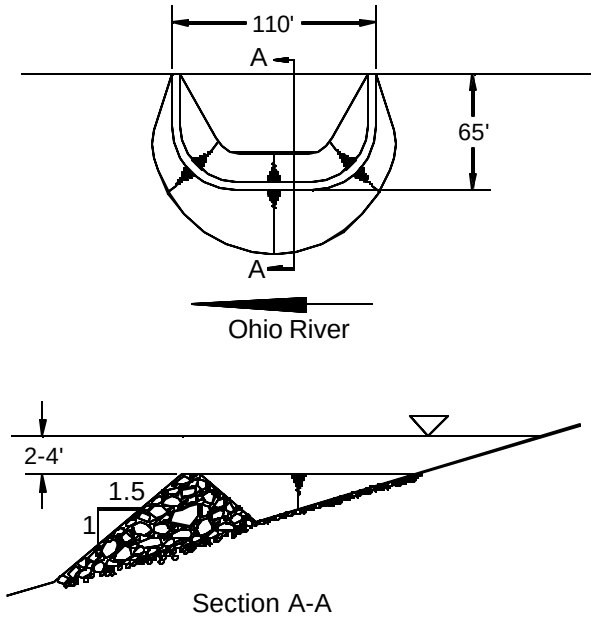
5.1 Existing Ecological/Engineering Concern

Habitat diversity within the upper Ohio River channel has declined due to the construction of dams, operation and maintenance of the navigational channel, and commercial sand and gravel dredging. Much of the river's bottom has become silted in resulting in a relatively monotypic substrate consisting of silt, mud, and organic matter. The placement of rock and/or gravel structures in the river channel and along the shallow shoreline would increase habitat diversity and provide benefits to several aquatic organisms.

5.2 Shallow Water Revetment Structures

An Shallow revetment is a rock structure designed to improve shallow water habitat for aquatic organisms. These structures would be placed, in a group of five, within the project area near the areas shown in the project diagram. The structures would be 110 feet in length, and "U" shaped (Figure 2). The side slopes would be 1.5 to 1, and the structure would be toed into the sub-grade a minimum of 2 feet. The size of the rock used shall be uniformly graded limestone with each rock weighing between 50 and 150 pounds. Normally a well-graded rock would be used, however, a uniform gradation would provide better aquatic habitat

Figure 2



5.2 Planning/Engineering Assumptions

- Average channel velocities are 3 feet per second.
- All rip-rap material would be shipped by barge to the project site. All costs for loading material onto the barge are included in the material costs.
- Excavated material from site preparation can be disposed of into the main river channel, or along the main channel bank.

6.0 Cost Estimate (Construction)

Engineering costs for the proposed projects are contained on Table 2. A detailed MCACES cost estimate for the proposed project is be included in Appendix C.

Table 2. Engineering Costs.	
Item	**Cost**
Shallow Water Revetments (Group of Five)	$267,500
Mobilization	$15,000
TOTAL	**$282,500**

7.0 Schedule

The estimated construction time for this project is shown on Table 3.

Table 3. Construction Schedule.	
Item	**Time**
Shallow Water Revetments (Group of Five)	40 Days
Mobilization	6 Days
TOTAL	**46 Days**

8.0 Expected Ecological Benefits

Terrestrial/Riparian Habitat: Construction for the Dashields Shallow Water Habitat Restoration project would remain in-stream. Therefore, there would be no reasonably foreseeable direct beneficial impacts to terrestrial/riparian resources.

Aquatic Habitats: Long-term beneficial impacts to aquatic resources would be anticipated as a result of implementing the proposed project. Placement of the rock structures and gravel substrates would lead to improved habitat diversity for aquatic species. Habitat requirements for fishes change seasonally. The submerged rock structures would provide spawning, nursery, and foraging habitat for fishes (Scott, 1989 and Sheaffer, 1986). Addition of the rocky substrate also would provide more silt-free submerged surface area for mussels and benthic invertebrates.

Wetlands: There would be no reasonably foreseeable beneficial impacts to jurisdictional wetlands as a result of constructing the proposed project.

Federally-Listed Threatened and Endangered Species: The rock structures and gravel substrates would potentially provide increased habitat diversity and protection for the endangered mussel species.

Socioeconomic Resources: There would be short-term and long-term beneficial impacts to socioeconomic resources as a result of implementing the proposed project. The short-term beneficial impacts would be related to costs and local expenditures associated with the construction of the structures. Long-term socioeconomic benefits would be realized through improved recreational fishing opportunities. Long-term indirect beneficial impacts will be realized through local expenditures for fishing tackle and gear, bait, food, gas, and other associated products.

9.0 Potential Adverse Environmental Impacts

Terrestrial/Riparian Habitat: During the site preparation and construction of the revetments, there would be a potential for short-term adverse impacts to terrestrial species from construction-related noise and disturbance. Considering the existing high volume of disturbance from barge and boat traffic along the Ohio River and nearby industrial areas and highways, it is likely that the increased noise/disturbance impacts would be very minor.

Aquatic Habitats: There would be a potential for short-term adverse affects to aquatic species, especially immobile benthic invertebrates during the construction of the structures and distribution of the gravel fill. Localized populations of benthic invertebrates could be covered with rip-rap or gravel during the construction phase. In addition, sensitive aquatic species immediately downstream from the site could be adversely impacted by degraded water quality associated with displaced sediments from the site preparation and construction. The adverse impacts to aquatic species would be short term, and the overall beneficial impacts of the restoration project would outweigh the adverse impacts.

Wetlands: There would be no adverse affects to jurisdictional wetlands as a result of constructing the structures for the proposed project.

Federally-Listed Threatened and Endangered Species: There would be a slight potential for adverse effects to the mussels during the construction of the rock structures. If present, individual mussels or localized populations could be covered with rip-rap or gravel during the construction of the revetments. In addition, mussels immediately downstream from the construction site could be adversely impacted by perturbed water quality conditions associated with displaced sediments. Considering the life histories of the mussels, i.e. preferring silt-free sand and gravel substrates with moderate to fast flows, it would seem unlikely that this species would be present in the immediate project area.

Socioeconomic Resources: There would be no reasonably foreseeable adverse socioeconomic impacts as a result of implementing the proposed project.

10.0 Mitigation

No significant adverse impacts are expected. Minor impacts associated with site preparation/excavation and rip-rap and gravel placement may occur during the construction of

this project, however, no significant adverse impacts are expected. The use of best management practices and proper construction techniques would minimize adverse water quality impacts.

11.0 Preliminary Operation and Maintenance Costs:

Operation and Maintenance costs are summarized on Table 4.

Table 4. Operation and Maintenance Costs		
Maintenance	**Frequency**	**Costs**
Repair of Rock Structures	25 years	$35,000

12.0 Potential Cost Share Sponsor(s)

- Pennsylvania Fish and Boat Commission, Wildlife Habitat Council

13.0 Expected Life of the Project

It is anticipated that the rock structures used for this project would have an intact life expectancy of 50 years.

14.0 Hazardous, Toxic, and Radiological Waste Considerations

Potential impacts of hazardous, toxic, and radiological waste (HTRW) at the site were visually assessed during a site visit.

Site Inspection Findings. The project area includes habitat enhancement in the Ohio River at ORM 11-11.5 in Allegheny County, Pennsylvania. The cities of Sewickly and Osborne Pennsylvania are on the north shore of the Ohio River near the project area.

The following environmental conditions were considered when conducting the September 21, 1999 project area inspection:

- Suspicious/Unusual Odors;
- Discolored Soil;
- Distressed Vegetation;
- Dirt/Debris Mounds;
- Ground Depressions;
- Oil Staining;
- Above Ground Storage Tanks (ASTs);
- Underground Storage Tanks (USTs);
- Landfills/Wastepiles;
- Impoundments/Lagoons;
- Drum/Container Storage;
- Electrical Transformers;
- Standpipes/Vent pipes;
- Surface Water Discharges;
- Power or Pipelines;
- Mining/Logging; and
- Other

A railroad was observed north of the project site. East of the project site is a Coast Guard Station located at an old, inactive, lock and dam site. A portion of the old lock wall exists within the river at the project site.

HTRW Findings and Conclusions. None of the environmental conditions listed above were observed in the project area.

15.0 Property Ownership & River Access

Selected data on properties immediately adjacent to each State of Pennsylvania concept site was collected from the county courthouse of the respective county of each site. Data collected included map and parcel identification number, property owner's name and mailing address, acreage of the potentially affected parcel, and market value of the parcel. This procedure involved obtaining a plat or parcel map of the site and surrounding area which identified each parcel with a corresponding map and parcel number. The map\parcel identification number was subsequently used to determine the property owner's name and mailing address from records in the County Assessor's or County Auditor's office. Plat\parcel maps were collected for each site.

The market value of each parcel as contained in the property tables reflects the assessed valuation ratio used in each State for taxation purposes. These assessed values reflect 1998 assessments. The assessed valuation ratio is 20.3 percent for Pennsylvania.

The above ratios were used to approximate the market value of each property. However, in many instances the resultant market value calculated under the above procedure is considerably below the actual value of the land in the real market. Local real estate brokers could provide a more accurate estimate of actual land values.

The collected property data indicate that private lands are adjacent to the project area. The creation of in river structures will not require land acquisition or agreements.

Table 5. Property Characteristics

Site Name: Dashields Shallow Water Habitat Restoration
Location: Allegheny County, Pennsylvania

Map/Parcel Number	Owner	Mailing Address	Market Value	Acreage
421J * 421N* 421P* 421R* 420D* 343A* 343E*	Pittsburgh, Ft. Wayne, Chicago Railroad Company	P.O. Box 8499 Philadelphia, PA 18101 (note: address to Conrail as agent)	Information Not available	Not determined

* Denotes improvements on property.

16.0 References

References:	
Scott, 1989	Scott, M.T. and L.A. Nielson. 1989. Young fish distribution in backwaters and main-channel borders of the Kanawha River, West Virginia. Journal of Fisheries Biology No. 35 (Supplement A) pp. 21-27.
Sheaffer, 1986	Sheaffer, W.A. and J.G. Nickum. 1986. Backwater areas as nursery habitats for fishes in Pool 13 of the Upper Mississippi River. Hydrobiology No. 136 pp. 131-140.
USFWS, 1991	U.S. Fish and Wildlife Service, 1991. Recovery Plan for Ring Pink Mussel (*Obovaria retusa*). Prepared by R.G. Biggins for the Southeast Region USFWS February, 1991. 24pp.
USFWS, 1991	U.S. Fish and Wildlife Service, 1991. Fanshell Recovery Plan. Prepared by R.G. Biggins for the Southeast Region USFWS July 9, 1991. 37pp.
USFWS, 1999	U.S. Fish and Wildlife Service, September 1, 1999. Federally Listed Endangered and Threatened Species in Pennsylvania.

APPENDIX A Threatened & Endangered Species

APPENDIX B Plan Formulation and Incremental Analysis Checklist

Project Site Location: The proposed Dashields Shallow Water Habitat Restoration project area is located in Allegheny County, Pennsylvania near Osborne. The area is located along the north shore of the Dashields Pool between Ohio River Miles (ORM) 11-11.5. The project site is within the jurisdiction of the Pittsburgh District, U.S. Army Corps of Engineers (USACE).

Description of Plan selected: The primary goal of the proposed Dashields Shallow Water Habitat Restoration project is to create and/or enhance shallow water habitats along the Ohio River shoreline. This project would involve placement of shallow water rock/gravel structures and fill along the shoreline. These rock structures and gravel fill would provide a hard substrate that would increase habitat diversity and ultimately species diversity.

Alternatives of the Selected Plan:

Smaller Size Plans Possible? Yes. Reduce the number of rock structures or amount of gravel fill.

Larger Size Plan Possible? Yes. Increase the number of rock structures or amount of gravel fill.

Other alternatives? No

Restore/Enhance/Protect Terrestrial Habitats? No **Objective numbers met**

Restore, Enhance, & Protect Wetlands? No **Objective numbers met**

Restore/Enhance/Protect Aquatic Habitats? Yes **Objective numbers met** A6

Type species benefited: Riverine fishes, mussels, and benthic invertebrates.

Endangered species benefited: Potential benefits to three endangered mussel species.

Can estimated amount of habitat units be determined: Implementation of the proposed project would enhance shallow water habitat within a 0.5 mile stretch of the upper Ohio River.

Plan acceptable to Resources Agencies?
U.S. Fish & Wildlife Service?
State Department of Natural Resources?

Plan considered complete? **Connected to other plans for restoration?**

Real Estate owned by State Agency? No **Federal Agency?** No
Real Estate privately owned? No
If privately owned, what is status of future acquisition? No acquisition would be required to implement this project because all construction would be in-stream.

Does this plan contribute significantly to the ecosystem structure or function requiring restoration? What goal or values does it meet in the Ecosystem Restoration Plan?

This plan would provide habitat diversity within shallow water areas of the Ohio River. These habitats would benefit several aquatic organisms.

Is this restoration plan a part of restoration projects planned by other agencies? (i.e. North American Waterfowl Management Plan, etc.)

In agencies opinion is the plan the most cost effective plan that can be implemented at this location?

Can this plan be implemented more cost effectively by another agency or institution?
Yes / No
Who:

From an incremental cost basis are there any features in this plan that would make the project more expensive than a typical project of the same nature? For embayment type plans is there excessive haul distance to disposal site? More expensive type disposal? Spoil that requires special handling/disposal?

Potential Project Sponsor:

Government Entity:_____
Non-government Entity _____

Corps Contractor _____Date_____

U.S. Fish & Wildlife Representative _____Date_____

State Agency Representative _____Date _____

U.S. Army Corps of Engineers Representative _____Date _____

Terrestrial Habitat Objectives

T1 Riparian Corridors

T2 Islands

T3 Floodplains

T4 Other unique habitats (canebrakes, river bluffs, etc.)

Wetland Habitat Objectives

W1 Forested Wetlands: Bottomland Hardwoods

W2 Forested Wetlands: Cypress/Tupelo Swamps and other unique forested wetlands

W3 Scrub/Shrub Emergent Wetlands: isolated from the river except during high water and contiguous (includes scrub/shrub wetlands in embayments and island sloughs)

Aquatic Habitat Objectives

A1 Backwaters (sloughs, embayments, oxbows, bayous, etc.)

A2 Riverine submerged and aquatic vegetation

A3 Sand and gravel bars

A4 Riffles/Runs (tailwaters)

A5 Pools (deep water, slow velocity, soft substrate)

A6 Side Channel/Back Channel Habitat

A7 Fish Passage

A8 Riparian Enhancement/Protection

APPENDIX C Micro Computer-Aided Cost Engineering System (MCACES)